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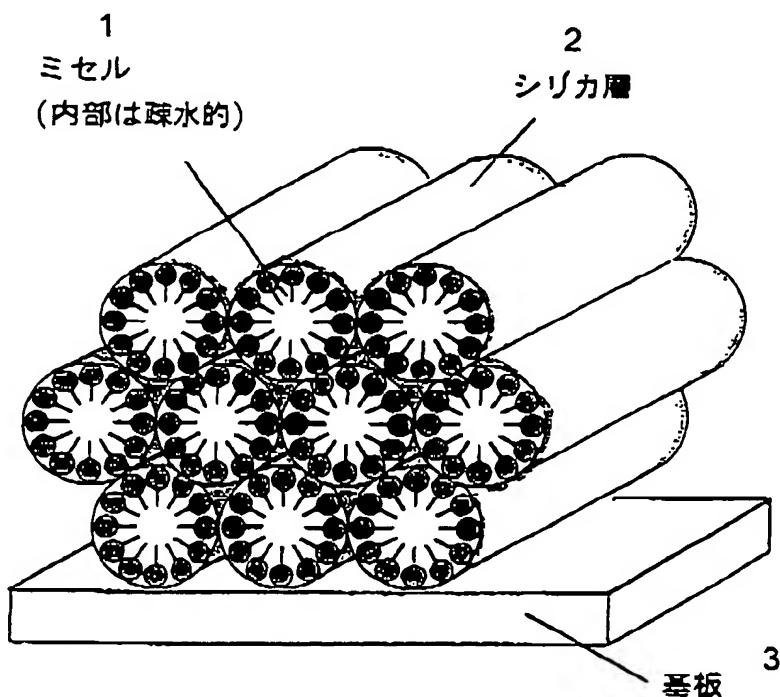
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(81)指定国(国内): CN, US.

/統葉有/

(54) Title: CRYSTAL OSCILLATOR NANOCHANNEL SENSOR

(54)発明の名称: 水晶振動子型ナノチャンネルセンサー



1...MICELLE (INSIDE IS HYDROPHOBIC.)
2...SILICA LAYER
3...SUBSTRATE

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展開を可能とする。

(57) Abstract: A crystal oscillator nanochannel sensor comprises a nanochannel structure thin film arranged on an electrode surface of a crystal oscillator and having an oxide layer which contains a surfactant micelle. The sensor senses the existence of a target substance in an analyte solution through a weight change in a nanochannel caused by a recognition reagent and the target substance collected by the recognition reagent. The invention provides a new application of crystal oscillator sensors by utilizing a hydrophobic site provided by the surfactant in a nanometer-size pore.

(57) 著約: 酸化物層が界面活性剤ミセルを内包しているナノチャンネル体薄膜を水晶振動子上の電極面に配設し、ナノチャンネル内での認識試薬と共に捕集された標的物質による重量変化から、標体溶液中の標的物質の存在を検出し、ナノメートルサイズの細孔内の界面活性剤の存在が与える疎水場に着目し、水晶振動子型センサー機能の新しい

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(84) 指定国(広域): ヨーロッパ特許(AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR).

2文字コード及び他の略語については、定期発行される各PCTガゼットの巻頭に掲載されている「コードと略語のガイドノート」を参照。

添付公開書類:
— 國際調査報告書

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP03/11385

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl' G01N5/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl' G01N5/02Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Toroku Jitsuyo Shinan Koho 1994-2003
Kokai Jitsuyo Shinan Koho 1971-2003 Jitsuyo Shinan Toroku Koho 1996-2003Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
JOIS (JICST FILE)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KAMISHO, TANAMURA, UCHIDA, TERAMAE, "Kaimen Kasseizai-Silica Nano Kozotai o Riyo shita Ion Ninshiki", The Japan Society for Analytical Chemistry Dai 50 Nenkai Koen Yoshishu, 09 November, 2001 (09.11.01), page 208	1-7
Y	TANAMURA KAMISHO, YAMASHITA, UCHIDA, TERAMAE, "Kagaku Shushokugata Nano Saikotai Sosei to Keiko Puropu o Mochiita Saikonai Kankyo Hyoka", The Japan Society for Analytical Chemistry Dai 49 Nenkai Koen Yoshishu, 12 September, 2000 (12.09.00), page 122	1-7

 Further documents are listed in the continuation of Box C. See patent family annex.

"A"	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E"	earlier document but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search
10 December, 2003 (10.12.03)Date of mailing of the international search report
24 December, 2003 (24.12.03)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

ATTACHMENT F

INTERNATIONAL SEARCH REPORT

International application No.:
PCT/JP03/11385

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	IYOSHI, KUROSAWA et al., "MPS-maku o Hifuku shita QCM no Shitsudo Sensor to shite no Oyo", The Surface Finishing Society of Japan Dai 104 Kai Koen Taikai Koen Yoshishu, 07 September, 2001 (07.09.01), pages 15 to 16	1-7
P,X P,Y	JP 2003-121329 A (President of Nagoya University), 23 April, 2003 (23.04.03), Full text; Figs. 1 to 3 (Family: none)	2-4,7 1
P,X P,Y	IKEDA, UCHIDA, FUJIWARA, "Suisho Shindoshigata Nano Channel Sensor no Kochiku", The Japan Society for Analytical Chemistry Dai 51 Nenkai Koen Yoshishu, 05 September, 2002 (05.09.02), page 107	1,3-6 2
A	Hongyou Fan, et al., Nature Vol.405, 04 May, 2000 (04.05.00), pages 56 to 60	1-7
A	HIRAYAMA, KAMEOKA, "Bunshi Imprinting-ho ni yoru Lyzozyme Chugata no Gosei Oyobi Sono Suisho Shindoshiki Sensor eno Oyo", Bunseki Kagaku, Vol.49, No.1, 2000, pages 29 to 33	1-7